nm in terms of the peak wavelength at room temperature. Then, as the etching process proceeds and the etching surface comes closer to the etching stop layer **19A**, which is made of p-type $Al_{0.10}Ga_{0.90}N$, the wavelength of the detected PL wavelength decreases to about 345 nm, which is shorter than that for the p-type second cladding layer **20**. This is greater than the Al composition of Al of the p-type second cladding layer **20**, is described above.

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For example, in a case where a 4-crystal x-ray diffraction (XRD) apparatus is used, the diffraction angle (2 θ) from the orientation (0002) plane, which is detected during an eteching process on the p-type second cladding layer **20** made of p-type $Al_{0.07}Ga_{0.93}N$, is about 34.7°. Then, as the etching process proceeds and the etching surface comes closer to the etching stop layer **19A**, which us made of p-type $Al_{0.10}Ga_{0.90}N$, the diffraction angel (2 θ) is detected to be about 34.8°. This is because the Al composition of the etching layer **19A** is greater than the Al composition of Al of the p-type second cladding layer **20**, as described above. Incidentally, the diffraction angle from the (0002) plane of GaN in this case is 34.6°.

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First, as in the first embodiment, a cap layer **41** made of p-type $Al_{0.15}Ga_{0.85}N$ is grown, as illustrated in FIG. **13**, by supplying TMA and TMG as group III materials, an NH_3 gas as a group V material, and a Cp_2Mg gas a p-type dopant, onto the substrate, while setting the temperature inside the reactor to about 1000° C and using hydrogen as a carrier gas.